

National Research Council/National Academy of Sciences
“Ozone Forming Potential of Reformulated Gasoline”

EPA Fact Sheet

May 24, 1999

The NRC Report

- EPA’s primary charge to the NRC (in 1996) was to determine whether smog-forming potential (i.e., the reactivity of the emission components) can be taken into account without adversely impacting the air quality benefits of the RFG program, which are now determined on the basis of mass-of-emissions reduced.
 - The report, released on May 11, 1999, concludes that there are “no compelling scientific reasons at this time” to recommend that smog-forming potential or reactivity replace mass-of-emissions in the RFG program. The report finds that “in none [of the cases studied] did the use of the reactivity metric fundamentally alter the conclusions” on RFG air quality benefits based on mass-of-emissions.
- The report confirms the significant air quality and public health benefits resulting from the use of RFG.
 - The report states that use of RFG can result in “a 20 percent reduction in the mass and reactivity of VOC emissions,” as well as reductions in CO and air toxics.
- The report recognizes the advantages of oxygenates like ethanol and MTBE in reducing toxic emissions, including benzene, a known carcinogen.
 - EPA’s view is that oxygenates significantly reduce toxics such as benzene and other aromatics. Oxygenates also dilute or displace other fuel components like sulfur, which in turn reduces emissions of the smog precursors VOC and NO_x. They also provide additional reductions in the distillation temperatures of gasoline. These improvements are important in reducing vehicle exhaust emissions, particularly during the first few minutes of cold engine operation when the catalytic converter is not fully operational.
- The report states that the reduction in peak smog levels from the RFG program would be “less than 10% at most” and states that the long-term trend downward in peak smog levels in the U.S. cannot “be significantly attributed to the use of RFG” alone.
 - EPA’s view is that the RFG program is a significant component of the country’s smog reduction strategy. RFG’s reductions of smog precursors, such as VOC, combined with other stationary and mobile source controls, together are responsible for the long-term downward trend in peak smog levels in urban areas across the country.
- The report finds that the contribution of CO to smog formation should be recognized in assessments of the effects of RFG.

- EPA is working with the California Air Resources Board to investigate the implications of these findings for RFG formulations.

EPA Comments on Air Quality Benefits of RFG

- There are significant air quality and public health benefits resulting from the use of RFG. This cleaner burning gasoline helps reduce smog-forming and toxic pollutants.
- About 75 million people are breathing cleaner air because of cleaner burning gasoline.
- Since 1995, RFG used in 16 states (CA, CT, DE, IL, IN, KY, MA, MD, NH, NJ, NY, PA, RI, TX, VA, WI) and DC resulted in annual reductions of:
 - Smog: About 36 thousand tons of VOCs and NO_x - same as removing 8 million vehicles
 - Toxics (e.g., benzene in gasoline): About 10 thousand tons of cancer-causing toxins - same as removing 14 million vehicles.
- The air quality trends data for 1995, the first year of the RFG program, shows a 43 percent reduction in benzene in the ambient air in RFG areas. In other words, a greater proportion of monitoring sites in RFG areas showed significant decreases in average benzene than did sites in non-RFG areas.

EPA's Comments on Fuel Quality Data

- The Phase I RFG program is designed to reduce the ozone (smog) precursor VOC and toxic emissions by 17 percent from 1990 baseline levels. EPA's preliminary analysis of 1998 fuel survey data indicates that, on average, refiners are producing fuel that is getting better VOC, toxics and NO_x reductions than are required by the program.
- Most RFG being produced today is already achieving even greater reductions in toxic emissions than will be required in the second phase of the program, which begins January 1, 2000.
- Some areas in the Northeast are doing better than is required under Phase II RFG for the smog precursor NO_x in the summer smog control season. Boston and Philadelphia are getting better results than the per gallon standard of a 5 percent reduction, and Maine, New Hampshire and Rhode Island are getting greater reductions than the average standard of 6.8 percent.
- On VOCs, all areas are meeting and exceeding the Phase I average and per gallon standards.

EPA's goal is to ensure that the best possible fuel additives are used so that all Americans can have cleaner air in order to best protect human health and the environment.